ABSTRACTS

ISCFR 2012

July 26-29, Whistler, Canada

7th International Symposium on Canine and Feline Reproduction

In a joint meeting with

EVSSAR 2012

15th Congress of the European Veterinary Society for Small Animal Reproduction

Editors: Gary England, Michelle Kutzler, Pierre Comizzoli, Wojciech Nizanski, Tom Rijsselaere and Patrick Concannon

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Determining male characteristics that influence female mate choice in the endangered black-footed ferret

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OBJECTIVES AND METHODS: The endangered black-footed ferret (\textit{Mustela nigripes}; ferret) was rescued from extinction when the last 18 individuals were brought into captivity in 1985 to initiate a breeding program. In 30 years, more than 7,700 individuals have been produced and ~2,900 have been reintroduced into 19 sites in eight states, Mexico and Canada. Unfortunately, ferret recovery is still limited by habitat loss, disease and reduced fertility with pregnancy rates ranging from 80\% to 43\%. Declining fertility may be attributed to female reproductive behavior, failed ovulation/ absence of pregnancy and/or reduced male fertility (normal sperm declining from 50\% to 16\%; 1, 2). Because ferrets are reflex ovulators, this species provides an opportunity to investigate cryptic female mate choice, in which females employ post-copulatory selection. Our goal was to determine the relationship among female mate choice behavior, ovulation and specific male characteristics. Our objective was to determine the relationship among male steroid hormones, reproductive physiology and female ovulation and pregnancy.

Ferrets were housed at the USFWS’s National Black-Footed Ferret Conservation Center (Carr, CO). Fecal samples were collected two times per week throughout the breeding season (January through May). Fecal hormones were extracted and androgen (FAM) and glucocorticoid (FGM) metabolites were analyzed by enzyme immunoassay (3). Semen was collected monthly via electroejaculation and evaluated for sperm motility (%), forward progression (scale of 0-5; 5=highest), testes volume, sperm concentration and morphology (1,2,4). Hormonal, seminal and pairing results were compared between males with high (>50\% of female paired with ovulated) and with low ovulation success (< 50\%) using a T-Test.

RESULTS: Results demonstrated that seminal traits and mean hormone concentrations were similar (P>0.05) between males with high and low ovulation success (Table 1). However, preliminary analysis suggested a positive relationship (y = 0.002x + 29.576; R\textsuperscript{2} = 0.0905; P=0.15) between female ovulation success and male FAM (Fig. 1) and a negative relationship (y = -0.0036x + 78.183; R\textsuperscript{2} = 0.0092; P>0.05) between female ovulation success and male FGM (Fig. 2).

Table 1: Male fecal hormonal and seminal results

<table>
<thead>
<tr>
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<th>Males w/ high rates of ovulation</th>
<th>Males w/ low rates of ovulation</th>
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<tr>
<td>Mean FAM (µg/g)</td>
<td>17.6 ± 1.7</td>
<td>15.1 ± 1.3</td>
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<tr>
<td>Mean FGM (µg/g)</td>
<td>4.0 ± 2.5</td>
<td>4.0 ± 2.5</td>
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<tr>
<td>Testes volume (cm(^3))</td>
<td>1.4 ± 0.1</td>
<td>1.4 ± 0.1</td>
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<tr>
<td>Normal sperm (%)</td>
<td>25.8 ± 4.8</td>
<td>35.7 ± 7.8</td>
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<tr>
<td>Sperm motility (%)</td>
<td>56.5 ± 3.8</td>
<td>59.4 ± 4.1</td>
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<tr>
<td>Sperm conc. (x10(^6)/ml)</td>
<td>300.5 ± 39.8</td>
<td>335.5 ± 80.6</td>
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CONCLUSION: Male FAMs may have a positive effect on female ovulation success, while male FGMs may negatively affect mating outcomes. Next, we will investigate the relationship of body morphology/symmetry and male genetics on female ovulation success. Funded by the Phoenix Zoo Conservation and Science Fund.


(2)Santymire RM, Marinari PE, Kreeger JS, Wildt DE, Howard JG. Sperm viability in the black-footed ferret (Mustela nigripes) is influenced by seminal and medium osmolality. Cryobiology 2006; 53:37-50.